# Perinatal Risk Factors for Morbidity vs Mortality

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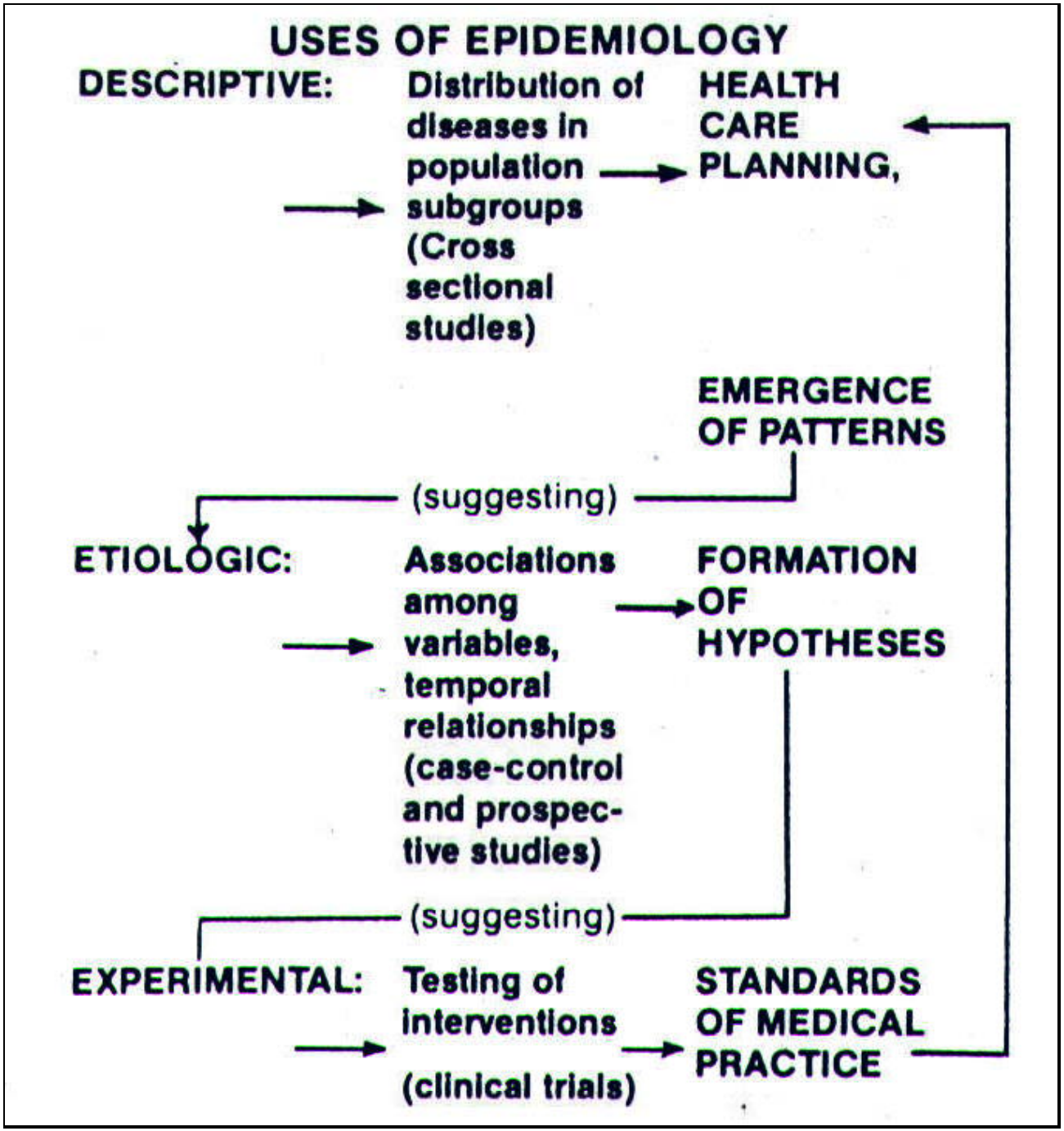

USES OF EPIDEMIOLOGY
DESCRIPTIVE:
Distribution of diseases in population subgroups (Cross sectional studies)
HEALTH CARE PLANNING,
EMERGENCE OF PATTERNS
(suggesting)
ETIOLOGIC:
Associations among variables, temporal relationships (case-control and prospective studies)
FORMATION OF HYPOTHESES
(suggesting)
EXPERIMENTAL:
Testing of interventions
(clinical trials)
STANDARDS OF MEDICAL PRACTICE

# Epidemiological Methods

- Focus on proportions of cases
  - Low incidence conditions
  - Policy decisions

- Separate risk to individual from risk to the population

| Risk Factor | Individual-Risk | Population-Risk |
|---|---|---|
| *Rare (LBW)* | High | Low |
| *Common (Poverty)* | Low | High |

# Risk Factors

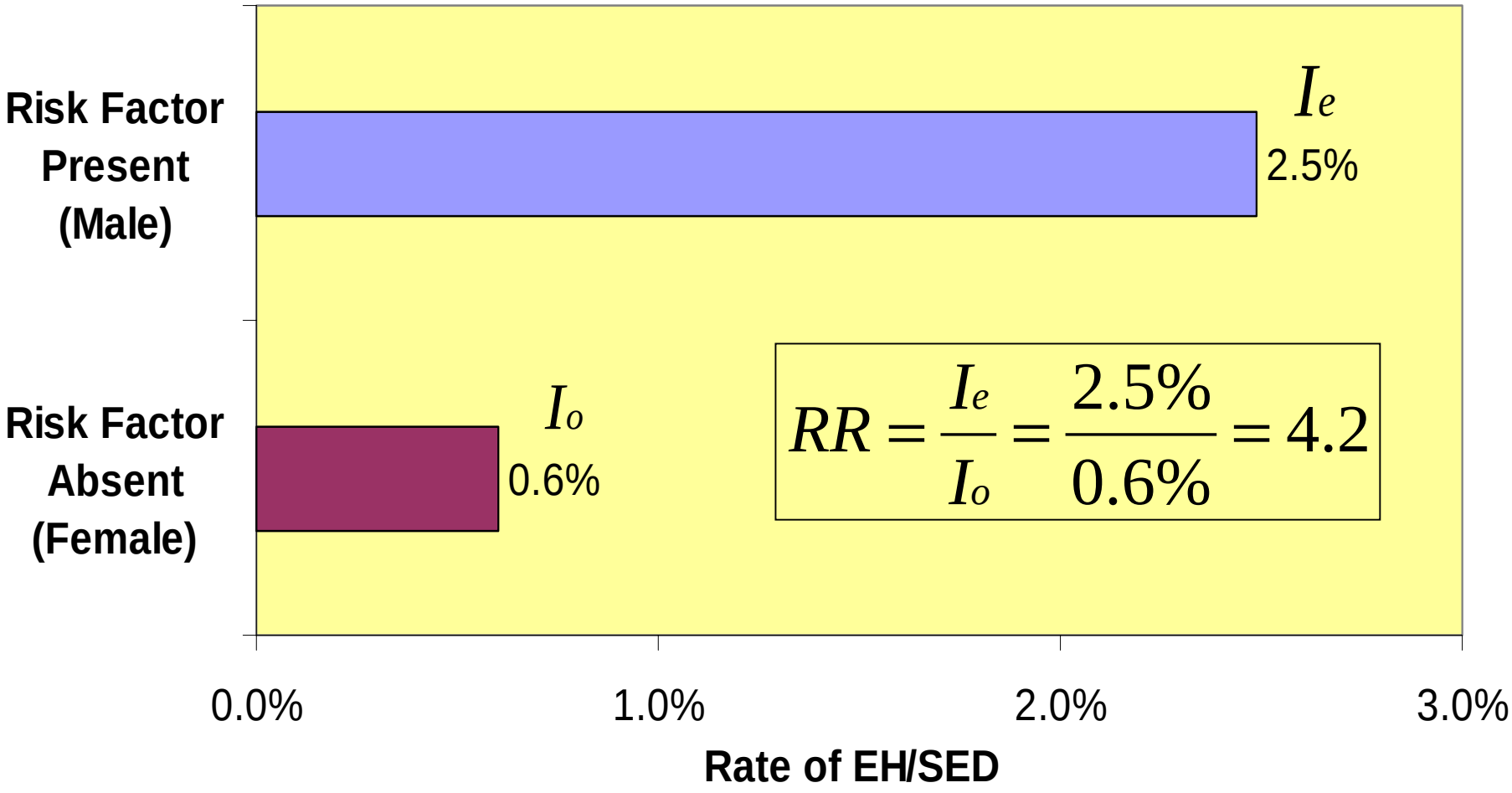
- ***Risk factor*** refers to any characteristic of a
  - Person
  - Place
  - Time
- Identifiable prior to the event
- Can be causal or a marker for other factors

# Electronic Data Linkage

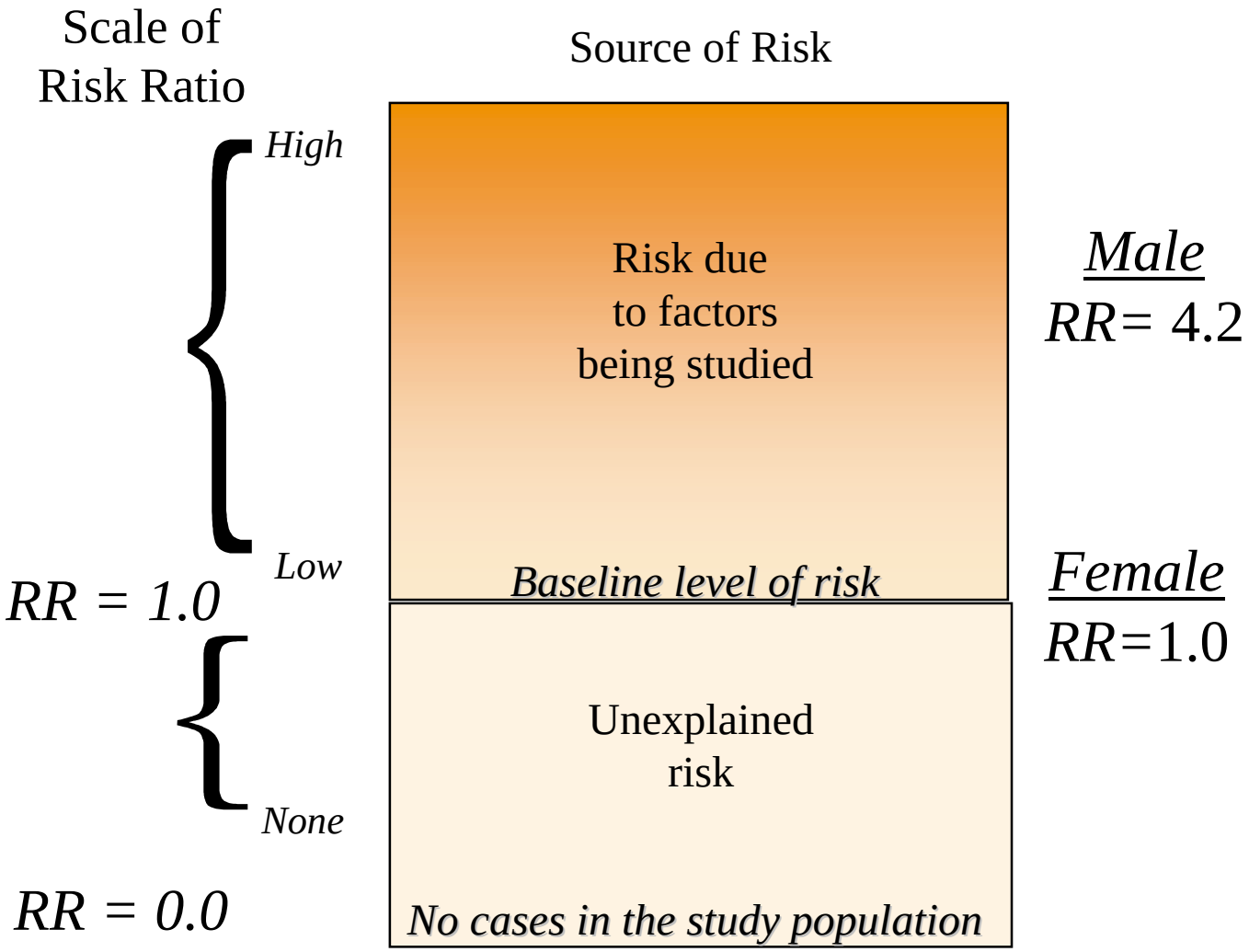
- ***Florida***: 1989-1990 birth certificates linked to 1997-98 public school records
  - 245,787 FL students who were born in FL
  - 41,612 (17%) in special education, not gifted

- ***Tennessee:*** Birth/death certificate linked file for 1989-1990 TN births
  - 145,355 live births
  - 1,487 (1%) were infant deaths

# Risk Ratio Calculation Example



# Epidemiological Concept of Risk Analysis



# Individual-level Risk: RR(95%CI)

## Infant Mortality

| | |
|---|---|
| ***apgar <4*** | 131.4 (119.7-144.3) |
| ***vlbw*** | 88.5 (79.7-98.4) |
| ***apgar 4-6*** | 31.7 (27.8-36.1) |
| ***pre-term*** | 17.4 (15.6-19.4) |

## EH/SED

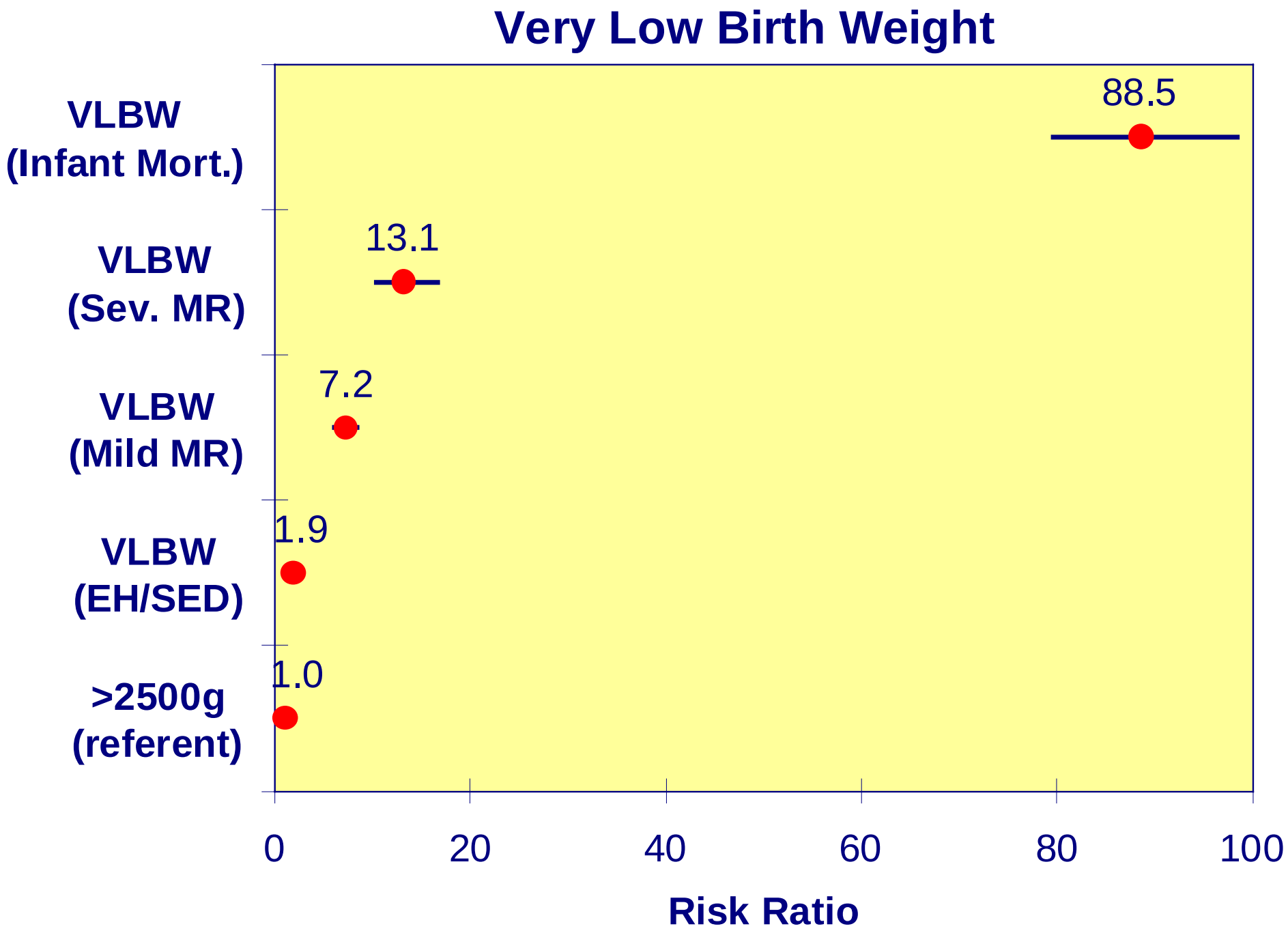
| | |
|---|---|
| ***male*** | 4.2 (3.8-4.5) |
| ***mom ed <12*** | 3.7 (3.4-4.1) |
| ***dad ed <12*** | 3.2 (2.8-3.7) |
| ***apgar <4*** | 3.1 (1.6-6.1) |
| ***unmarried*** | 3.1 (2.8-3.2) |

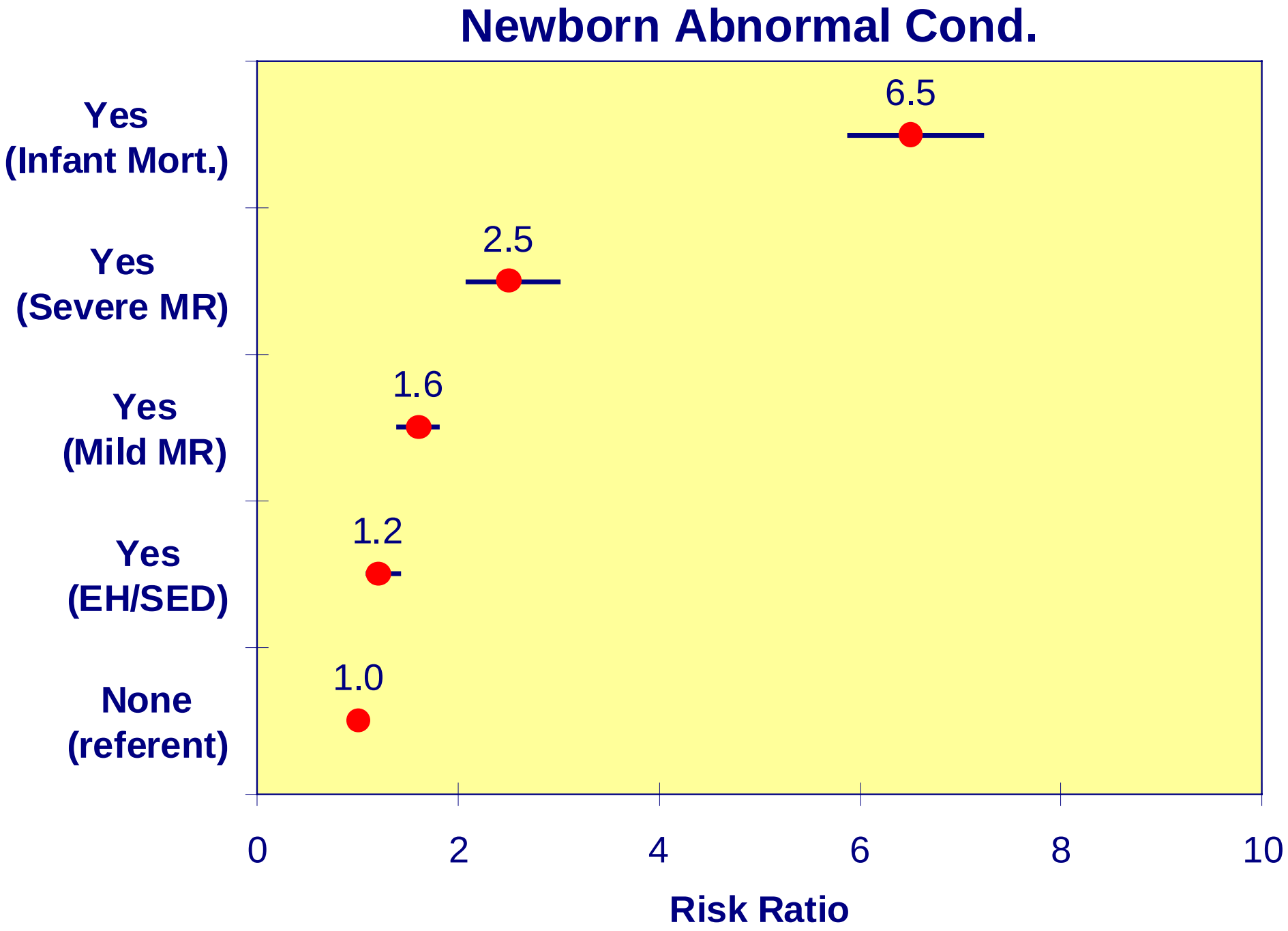
## Mild MR

| | |
|---|---|
| ***apgar 4-6*** | 8.3 (6.0-11.6) |
| ***vlbw*** | 7.2 (6.2-8.4) |
| ***mom ed <12*** | 5.5 (4.9-6.2) |
| ***dad ed <12*** | 4.4 (3.9-5.1) |
| ***apgar <4*** | 4.1 (3.3-5.0) |

## Mod/Sev/Prof MR

| | |
|---|---|
| ***apgar <4*** | 19.5 (11.5-33.0) |
| ***vlbw*** | 13.1 (10.3-16.7) |
| ***apgar 4-6*** | 12.6 (10.0-15.9) |
| ***congen. abn.*** | 10.6 (8.8-12.9) |


Very Low Birth Weight
VLBW (Infant Mort.)
VLBW (Sev. MR)
VLBW (Mild MR)
VLBW (EH/SED)
>2500g (referent)
88.5
13.1
7.2
1.9
1.0
0
20
40
60
80
100
Risk Ratio


Newborn Abnormal Cond.
Yes (Infant Mort.)
Yes (Severe MR)
Yes (Mild MR)
Yes (EH/SED)
None (referent)
6.5
2.5
1.6
1.2
1.0
0
2
4
6
8
10
Risk Ratio

# Population Attributable Fraction (PAF) %

- Pulls together information about:
  - *Risk* associated with exposure to a risk factor (RR)
  - *Prevalence* of exposure to a risk factor ($P_e$)

- Weights risk ratio by % of population that has experienced the risk factor

$$PAF\ \% = \frac{P_e(RR - 1)}{1 + P_e(RR - 1)} x100$$

# Population-level Risk: PAF%

## Infant Mortality

| Pe | RR | Risk Factor | PAF% |
|---|---|---|---|
| 11% | 17.4 | ***Pre-term*** | **65%** |
| 2% | 62.0 | ***Apgar < 7*** | **54%** |
| 2% | 88.5 | ***VLBW*** | **51%** |
| 35% | 3.2 | ***Labor/Del. Comp.*** | **44%** |
| 11% | 6.5 | ***Newborn Cond.*** | **38%** |

## EH/SED

| Pe | RR | Risk Factor | PAF% |
|---|---|---|---|
| 52% | 4.2 | ***Male*** | **62%** |
| 33% | 3.1 | ***Unmarried*** | **41%** |
| 27% | 3.7 | ***Mom Ed <12*** | **35%** |
| 34% | 3.2 | ***Dad Ed <12*** | **23%** |

## Mild MR

| Pe | RR | Risk Factor | PAF% |
|---|---|---|---|
| 27% | 5.5 | ***Mom Ed <12*** | **44%** |
| 33% | 2.8 | ***Unmarried*** | **37%** |
| 20% | 4.4 | ***Dad Ed <12*** | **29%** |
| 44% | 2.5 | ***Dad Ed =12*** | **28%** |

## Mod/Sev/Prof MR

| Pe | RR | Risk Factor | PAF% |
|---|---|---|---|
| 52% | 1.4 | ***Male*** | **19%** |
| 27% | 2.0 | ***Mom Ed <12*** | **19%** |
| 33% | 1.7 | ***Unmarried*** | **18%** |
| 8% | 3.4 | ***Pre-term*** | **16%** |

Pe = Prevalence of Risk Factor in Population

# Summary

- Patterns of risk vary based on:
  - Outcome
  - Level of analysis
- Epidemiological approach useful for developmental researchers
  - Target high-risk populations
  - Estimate potential effects of an intervention
  - Form etiologic hypotheses which guide basic research into biomedical cause (if present)